

## **WORKSHOP SUMMARY**

### **GLOBAL DISASTER MITIGATION AND RESPONSE CHALLENGES AND OPPORTUNITIES**

The U.S. National Weather Service, International Activities Office (NWS/IAO), organized a special International Session that preceded the American Meteorological Society Annual Meeting in Seattle, WA. The purpose of the International Session, which was held on January 9, 2004, was to address emerging challenges and opportunities for National Meteorological and Hydrologic Services (NMHSs) in the area of disaster mitigation and response. This session was one in a series of International Sessions, sponsored by the NWS/IAO over the past several years, which provide a discussion forum for various issues facing NMHSs throughout the world. The principal outcomes of this session were to provide the attendees with an enhanced understanding of the existing and future challenges of disaster management issues affecting services in all countries and to have the attendees discuss potential approaches to addressing these issues. In all there were 54 participants in attendance representing NMHSs, international organizations, and the private sector from 20 countries (including the United States).

As pointed out in presentations during this session, the number of natural disasters, the number of people affected, and the costs associated with damages have steadily increased over the past three decades. In the 1990s alone, impacts of natural disasters of a meteorological or hydrologic origin cost US\$500 billion globally with the resultant loss of 200,000 lives. Consequently, there is no question that the disaster management roles of the NMHSs are changing and that additional needs, requirements, social demands, and responsibilities are being levied on these services by their own government agencies, the public, and the commercial sector. It was therefore evident to the NWS/IAO that a session on the subject of disaster management would be very timely as this is an area in which NMHSs are now devoting more attention and resources and are contributing more to national disaster management programs.

#### **SESSION TOPICS AND PRESENTATIONS**

There were five invited presentations covering the discussion areas described below. A question and answer period followed each speaker and a group overview/discussion was held after all the presentations were completed. The session was opened by Mr. John Jones, Deputy Director, U.S. National Weather Service. Dr. William Hooke, Director and Senior Policy Fellow, Atmospheric Policy Programs, American Meteorological Society was the session moderator.

1. **World Meteorological Organization Role in Disaster Mitigation and Response**, Mr. Michel Jarraud, Secretary General, World Meteorological Organization (WMO)

*Overview: The WMO has played a pioneering role in the global coordination of meteorological services and observations. As it looks towards the future, the WMO seeks to play an increasing role in disaster mitigation and response and has begun new initiatives to promote the involvement of NMHSs in disaster reduction. This presentation addressed the opportunities these new initiatives create for the WMO and its member nations.*

2. **New Views on Disaster Risk Reduction and its Relevance to National Meteorological and Hydrological Services**, Dr. Reid Basher, Senior Advisor, United Nations International Strategy for Disaster Reduction (ISDR)

*Overview: NMHSs have an important and increasingly prominent role to play facilitating the ISDR goal of reducing human, social, economic and environmental losses due to natural hazards and environmental disasters. This presentation explored the opportunities and challenges these new, broader roles create for NMHSs, as well as how the UN and the ISDR can facilitate their transition and aid their efforts.*

3. **Early Warning Systems: A Tool for Mitigation and Coordination**, Dr. Juan Carlos Villagrán de León, CEO, VILLATEK, S.A.

*Overview: Early warning systems (EWSs) reduce the impact of natural phenomena by means of an effective warning. This presentation addressed how these systems will help facilitate the future implementation of risk-reduction management. The presentation focused on the lessons learned by Central America, where the region's community-operated EWSs are offering local authorities in flood-prone communities an alternative to supplement the national, centralized weather information systems.*

4. **Coordination of NMHS and Emergency Response Agency Efforts**, Mr. Josh Batkin, Director – International Programs, U.S. Federal Emergency Management Agency (FEMA)

*Overview: Coordinating the efforts of NMHSs and Emergency Response Agencies is crucial for successful risk-reduction management. The lessons of coordination were discussed in the context of the cooperative efforts of FEMA and the U.S. National Weather Service (NWS). Specifically, the presentation addressed how FEMA coordinates with the NWS in mitigation, preparedness, response, and recovery efforts and how this collaboration is accomplished domestically and internationally.*

5. **Risks and Opportunities for NMHSs in Raising the National Priority Level of Disaster Mitigation**, Dr. Jean-Pierre Beysson, Director General, Meteo-France

*Overview: Elevating risk-reduction policy to a national priority requires high-level advocacy and a willingness to work in coordination with other national, state and local agencies. The presentation addressed the risks and opportunities such efforts create for NMHSs, and how to overcome those risks and take full advantage of the opportunities. A primary focus of the presentation was discussion of the types of color-coded graphics (vigilance charts) used by Meteo-France in warning the public about pending extreme weather events and their potential impacts.*

The above presentations are available from the NWS/IAO through their web site at [www.nws.noaa.gov/iao/site/iao\\_home\\_ie.htm](http://www.nws.noaa.gov/iao/site/iao_home_ie.htm).

## DISCUSSION SUMMARY

The speakers were challenged by the moderator to make their presentations stimulating in order to generate questions, comments and discussion. They were successful at doing that as each of the above topics generated a great deal of discussion amongst the participants – clearly the subject of NMHS roles in disaster mitigation and response is an important one in the meteorological and hydrologic community world-wide. The following is a summary of some of the key discussion points.

### WMO Activities

Beginning the meeting with a discussion of the WMO's role and philosophies relative to NMHSs and disaster management was important in order to provide an overview of WMO's view of the current state of these issues around the globe. The WMO has been active in supporting its Members with its role focused on the areas of monitoring, forecasts and early warnings, vulnerability and risk assessments, and applications (e.g., to agriculture, water resources). The WMO can and has contributed to reducing and mitigating natural disasters through various programs that address **risk identification** – e.g., monitoring, early warning systems, adaptation approaches to reduce vulnerabilities; **knowledge management** – e.g., improved predictive capabilities, user education; **risk management applications** – e.g., flood management; **preparedness and emergency management** – e.g., effective coordination and cooperation between responsible agencies; and **governance support** – e.g., promote natural disaster mitigation as national priorities. There are opportunities for NMHSs to take advantage of this support through WMO programs, including –

the Global Observing System, World Climate Programme, World Weather Research Programme, and the Associated Programme on Flood Management.

The WMO recognized the significant role WMO and NMHSs play in international disaster reduction activities for meteorological or hydrologic natural disasters during its 14<sup>th</sup> Congress in May 2003. During the Congress, the WMO instituted a new program – Natural Disaster Prevention and Mitigation. The purpose of this cross-cutting program is to enhance international cooperation and collaboration in the area of natural disaster mitigation. Other outputs from the Congress included acknowledgement of the need to develop an effective and efficient mechanism to provide, in an integrated fashion, the WMO response to the requirements and needs of Members and the international community concerning disaster reduction. In addition, WMO seeks to encourage and assist Members in developing and enhancing the NMHSs contributions to national disaster preparedness programs in a more fully integrated manner – in coordination with national civil defence and disaster agencies at the national, regional and international level; across multiple domains including observations, communications, and data processing; and across multiple disciplines including the social sciences.

### **NMHS Paradigm Change**

During the course of the session, a common theme discussed was the idea that the NMHSs must play to their existing strengths (e.g., understanding of weather, water and climate) but must also reinvent themselves by becoming more involved in understanding the social needs and requirements and economic impacts of disasters. The NMHSs must move beyond their traditional technical and product focuses – NMHSs must now be a leader in disaster management and promote advocacy, education, and national disaster reduction platforms within their countries. The NMHSs must begin to open up internally within their country to allow cooperation; they must consider sharing their information and data more than in the past – for example, for water management and food security concerns. Integration, collaboration and coordination with all disaster-related agencies are necessary requirements to ensure that the proper message (e.g., warning) is communicated in a timely, understandable manner to those that need it to respond effectively – otherwise the message may not have any use.

The services need to collaborate with each other, perhaps within the WMO framework, to collect more and better hydrometeorological data; improve the accuracy, timeliness and dissemination of warnings; improve early warning capabilities; and, perform hazard assessments. Though not addressed in detail at the session, there is also a continuing need to improve weather, climate and hydrologic forecasting capabilities (as an important component to early warning) and build capacity.

#### **Hydrometeorological Monitoring**

Sustainability of hydrometeorological monitoring networks is an issue that NMHSs must address. This includes having the appropriate hardware and tools and having the properly trained human resources to maintain the networks. A major problem in many developing nations are the drastic budget cuts as part of the measures being undertaken by governments to reduce spending in reaction to demands from various financial institutions. If these budget cuts affect the sustainability of monitoring networks and reduce the availability of data, they could inhibit the possible analysis of climate change in these developing nations. This could then make it more difficult to forecast such changes, and thus more difficult to guide urban and rural communities on measures to take to minimize the impact of such changes.

#### **Products and Warnings**

Efforts are also needed to improve products (e.g., accuracy, clear and specific warnings, informational statements) and services – i.e., become more user oriented and understand what their users require. Warnings may need to be more than just a statement of potential hazards but also

detail the potential impacts as well. To accomplish this, it may require a partnership with social scientists to learn how to properly convey this information, especially for those warnings disseminated directly to the public. An example of an improved product is the vigilance chart developed by MétéoFrance. This color-coded chart is used to inform both the public and disaster management authorities in a straight-forward, easy to understand manner about potential meteorological impacts. Though products may now need to provide more information, NMHSs are not expected to do the work of the disaster management agencies. They must collaborate with them to evaluate the entire disaster management end-to-end process to determine their respective areas of responsibility.

Proper dissemination of products is also important. The Internet has provided an efficient, relatively inexpensive dissemination system and can be a useful tool to provide data and information to all users. However, ironically, in many parts of the developing world, the Internet may be a tool that reduces the effectiveness of NMHSs. NMHSs now compete with the wealth of information available through the Internet to where some users may opt to get the information they need from other than their own local NMHS. The amount of data available to the media via the Internet is placing a huge demand on the NMHSs to integrate regional and national data to create a more precise picture, as well as to provide some local context to regional and international trends in weather as displayed in the various Internet-related web-pages. NMHSs must now find ways to have local users want to access their information first.

#### Early Warning Systems

Early warning systems apply to various time scales – from short term conditions such as flash floods through climate alert systems for early warnings on pending significant climate anomalies. The responsible organizations for installing, maintaining, and operating these systems varies as well (e.g., NMHSs, communities, disaster management agencies) but NMHSs will always be involved. NMHSs can be the developers/operators of such systems and also provide technical input, guidance and support. In all cases, the NMHS needs to be involved with the ultimate user of the information from the early warning system and must be aware of the needs and requirements for an effective system. A good example is in El Salvador where the NMHS operates an early warning system for floods and flash floods. The NMHS is part of an agency that has a department for public communications and through that department they work with the communities to understand what is needed for flood warnings. The NMHS has the responsibility to provide warnings to the community and disaster management agency and the community has the ultimate responsibility to take the appropriate action. After an event, the NMHS talks with the communities (their users) to understand how they used the warning and, based on that warning, what actions were or were not taken and why. This approach totally involves the NMHS in the end-to-end warning process and lets them better understand their users' requirements. This approach could apply to any early warning system.

#### Hazard Assessments

Increases in disasters cannot be completely contributed to changes in the nature or number of extreme weather events – the growth in disasters is also a sign of unsustainable development. Among the emerging issues discussed within the session was the need to address the challenge of natural disaster reduction which many nations are facing as a consequence of population growth and settlement in high-risk areas. While it was recognized that many of the recent disasters are caused by hydrometeorological phenomena, various speakers and participants pointed out that social issues also need to be addressed as contributors to natural disasters. Social processes dealing with vulnerabilities are still not well understood. Nevertheless, progress has been made in creating a conceptual model which allows scientists from natural and social areas to join forces in understanding the causes which lead up to disasters – namely, risks and the concept that risk reduction is also an important aspect of disaster management. Within the framework of risk management, risks can be modeled via hazards, vulnerabilities, and deficiencies in preparedness. In this context, risks are precursors to disasters

much as rainfall is a precursor to floods. Among the leading causes for risk generation in developing nations, two stand out dramatically – the lack of zoning ordinances to control growth and urban settlement in high-hazards areas, as well as the lack of building codes and their enforcement to promote less vulnerable infrastructure. Hazard assessment is seen as the natural step to be undertaken by the NMHSs to map the various types of hazards related to hydrometeorological phenomena using GIS tools. Such products would then benefit municipal authorities in the development and implementation of zoning schemes so desperately needed to inhibit settlement in high-hazard areas.

### **Funding Issues**

Though it is understood that this increased level of responsibility for NMHSs can be restricted by limited resources, especially in the developing countries; it was felt that the greater involvement of the services through a forward-thinking integrated approach, user-oriented concepts, and technical improvements are areas that will help improve the service's credibility and image in the eyes of their governments and the public and may lead to more preferential funding considerations. This improvement may provide allies and lobbyists for improved NMHS funding from sources such as insurance/reinsurance companies and private industry as well. In much of the world, an appropriate level of funding is a crucial element for obtaining improved technology but also, just as importantly for NMHSs, for investing in the human resources and in capacity building.

### **FEMA and NWS Example**

The coordinated efforts of FEMA and the NWS were presented as an example of the collaborative efforts between an NMHS and a disaster management agency. There is close collaboration between FEMA and NWS on disaster management – an effort that both agencies strive constantly to improve. The two agencies work closely on determining the appropriate format and content of NWS products that are needed by emergency managers.

FEMA relies on the NWS in all areas of disaster management. NWS supports FEMA in **mitigation** by providing the required hydrometeorological data FEMA needs to promote sound building practices through flood mapping and flood insurance. NWS and FEMA collaborate closely on **disaster preparedness** as NWS provides and disseminates advisories and warnings, while FEMA educates the public about the warnings and provides guidance on what actions to take during the emergency. NWS supports FEMA during **response** activities by providing forecasts that are used by emergency managers to preposition the resources and personnel needed to respond to the event.

## **CONCLUSIONS**

It was agreed by all that the goals of the session were clearly met. The participants got a better understanding of the current status of NMHSs in disaster management and discussed where they need to go from this point. The NMHS disaster-management-related issues and some possible solutions were discussed and ideas were brought forth for the services to consider. Importantly, this session provided a forum for NMHSs to begin cooperation and collaboration on disaster management.

The NMHSs are at the beginning of the process of being more intimately involved in disaster management so the final answers to the issues and questions raised at this session are forthcoming but may be a few months or a few years away. So it was agreed that the dialogues must continue in similar or other forums but in the interim, the NMHSs must begin the process of change. Most likely the important message to the NMHSs that came through during this session was – cooperate, collaborate, open up, and begin to change the NMHS paradigm.